

Vacuum Monitor General Description

MONITOR DTC TABLE

DTC		Document Title	See Page
Extended Code	Previous Code		
P0442	P0440	EVAP Leak Monitor Description (0.040 in)	Ev-50
P0456	P0442	EVAP Leak Monitor Description (0.020 in)	
P0441	P0441	EVAP VSV Monitor Description	Ev-59
P0446	P0446	CCV and VSV for Bypass Valve Monitor Description	Ev-71
P0452	P0450	Vapor Pressure Sensor Monitor Description	Ev-94
P0453			
P0451	P0451	Vapor Pressure Sensor Range/Performance Monitor Description	Ev-96

NOTE:

Some DTCs may have different meanings from those listed above depending upon the EVAP Monitoring strategy. To identify which strategy is used on each model, refer to EVAP Monitor Summary (See page [Ev-1](#)).

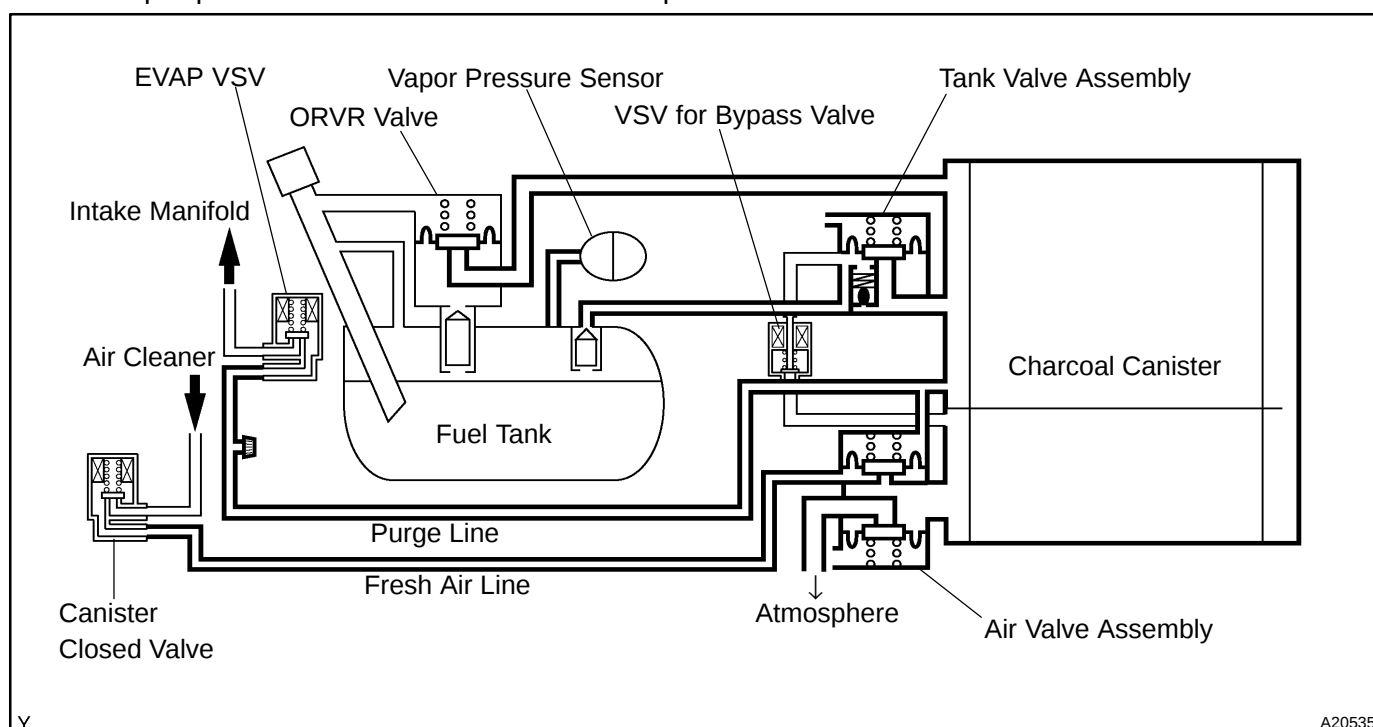
MONITOR INTRODUCTION

2000 or later models have a "vacuum monitor" type of the EVAP system.

This system monitors how much vacuum will be in the fuel tank and charcoal canister by producing vacuum there using vacuum in the intake manifold. This enables the system to find leaks in the EVAP system and a malfunction of the 3 VSVs installed in this system.

This EVAP system consists of the following main components:

- A canister closed valve (CCV) that closes the fresh air line from the air cleaner to the charcoal canister.
- A VSV for bypass valve that opens the evaporator line between the fuel tank and the charcoal canister.
- Function to close the purge line from the air intake manifold to the charcoal canister for this system.
- A vapor pressure sensor that measures the pressure in the fuel tank.



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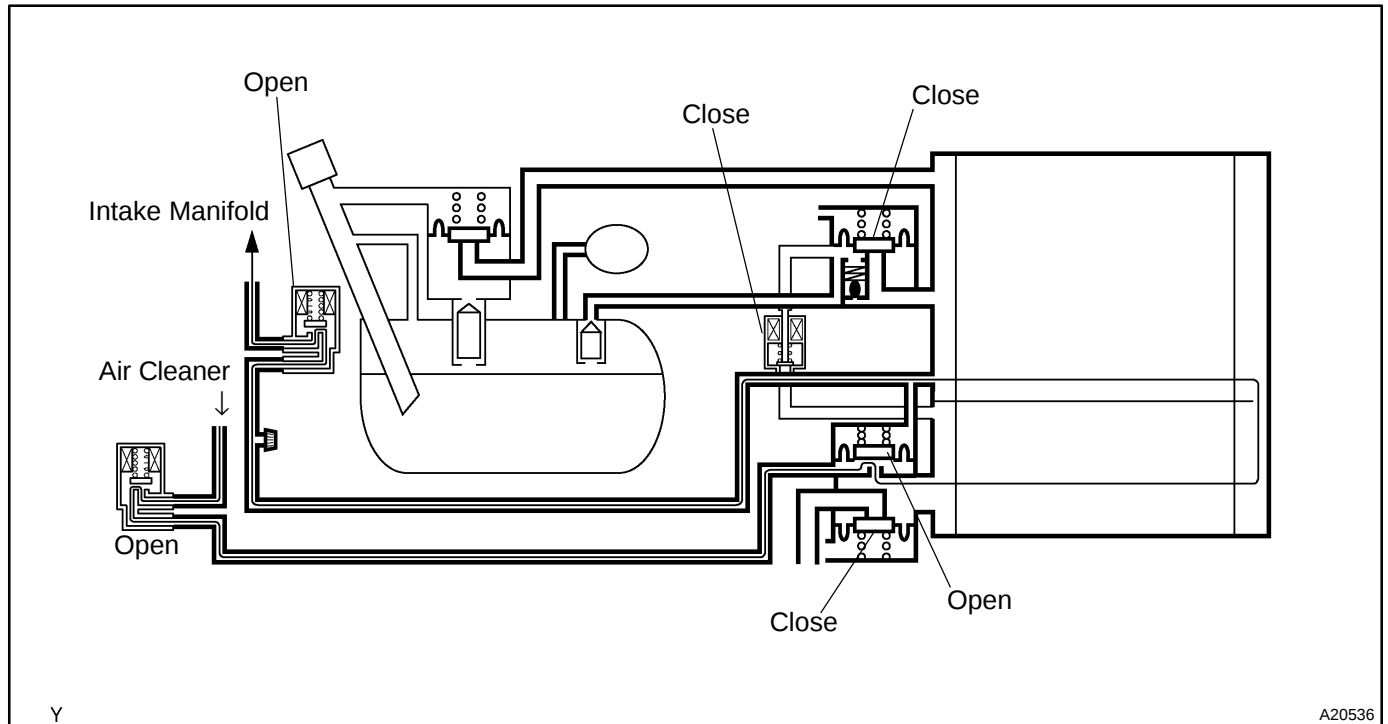
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SUMMARY OF SYSTEM OPERATION

1. Purge Flow

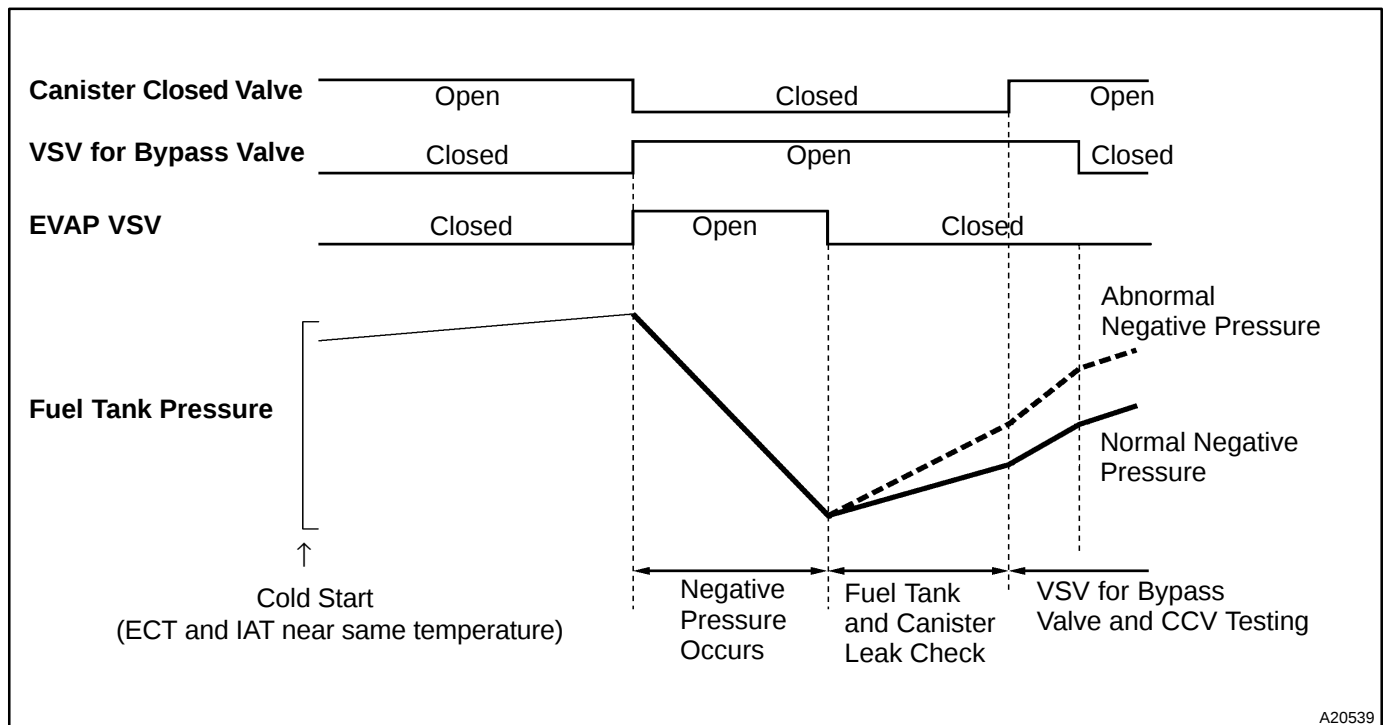
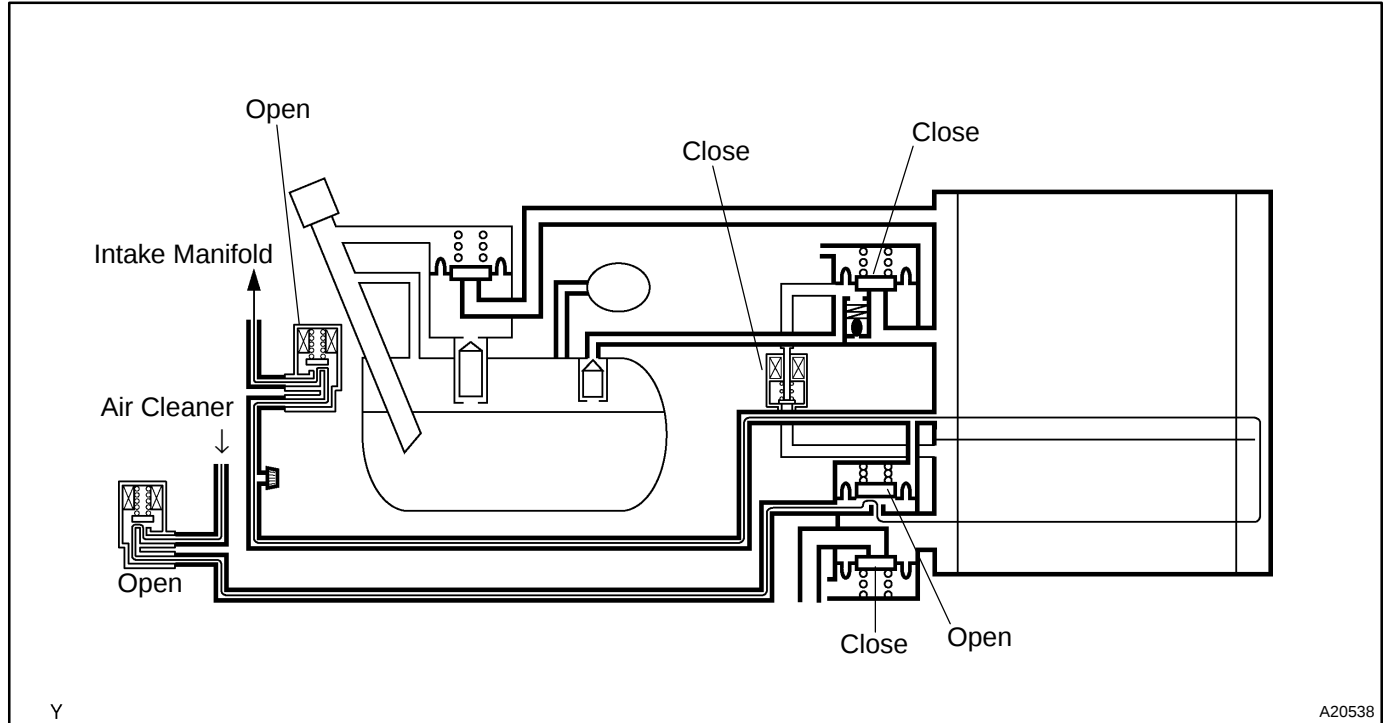
When the engine has reached predetermined parameters (closed loop, ECT above 75°C/167°F, etc.), stored fuel vapors are purged from the charcoal canister whenever the EVAP VSV is opened by the ECM. At the appropriate time, the ECM will turn on the EVAP VSV.

The ECM will change the duty ratio cycle of the EVAP VSV thus controlling purge flow volume. Purge flow volume is determined by manifold pressure and the duty ratio cycle of the EVAP VSV. Atmospheric pressure is allowed into the canister to ensure that purge flow is constantly maintained whenever vacuum pressure is applied to the canister.



2. EVAP Monitor

The monitor sequence begins with a cold engine start. The IAT and ECT sensors must have approximately the same temperature reading. The ECM constantly monitors fuel tank pressure. As the temperature of the fuel increases, pressure rises slowly. The ECM will purge the charcoal canister at the appropriate time. With VSV for bypass valve closed, pressure will continue to rise in fuel tank.



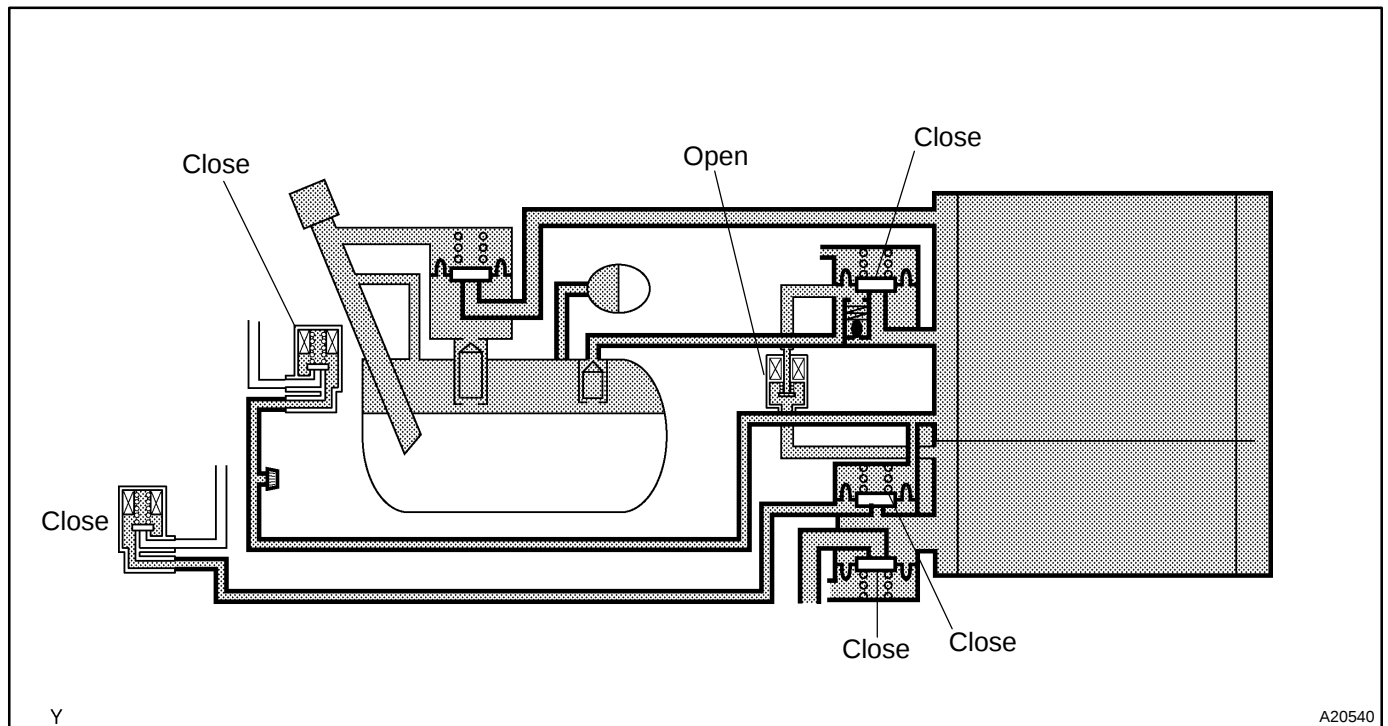
3. EVAP Leak Monitor (Previous DTC: P0440 or P0442) (Extended DTC: P0442 or P0456)

At first the ECM closes the canister closed valve and opens the VSV for bypass valve causing a pressure drop in the entire EVAP system.

The ECM continues to operate the EVAP VSV until the pressure is lowered to the specified point at which time the ECM closes the purge valve.

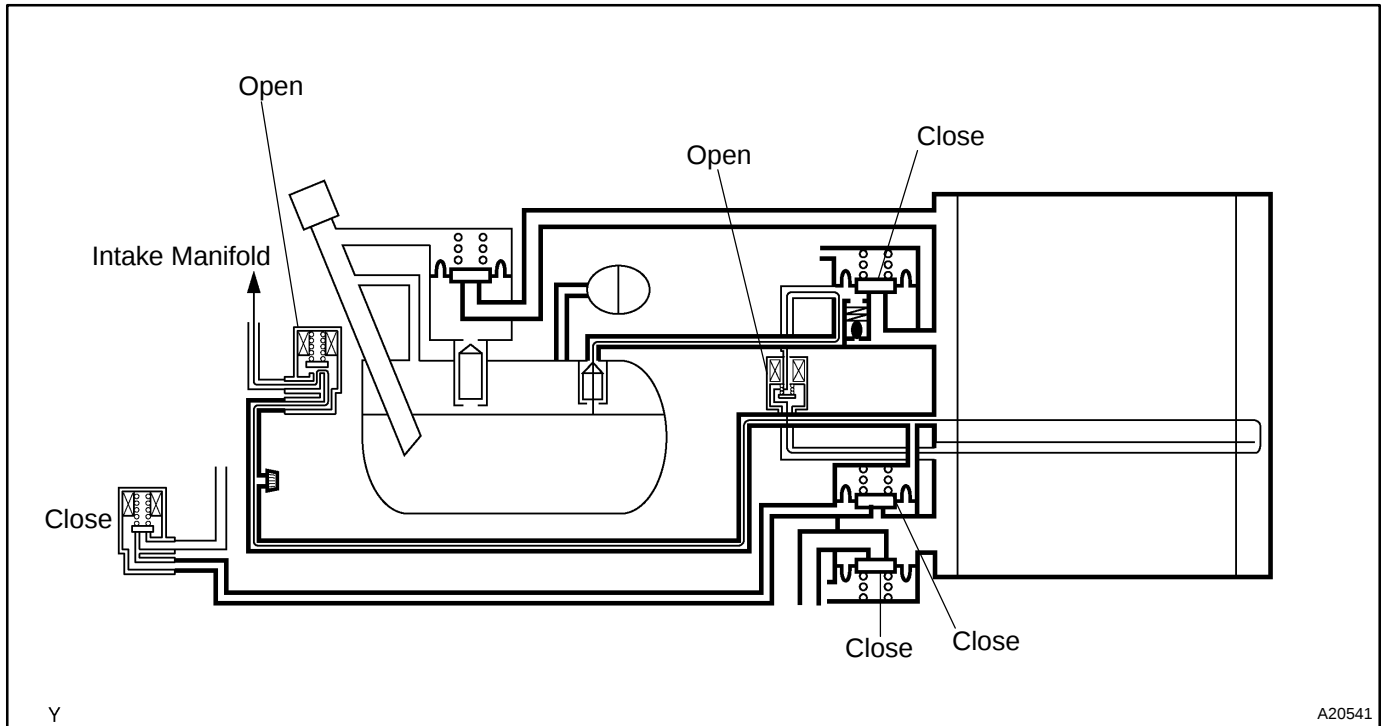
After the EVAP VSV operation, the EVAP VSV turns off sealing the vacuum pressure in the system and the ECM begins to monitor the pressure increase.

Some increases in pressure are normal. A very rapid, sharp increase in pressure indicates a leak in the EVAP system. If a leak is detected, the MIL illuminates.



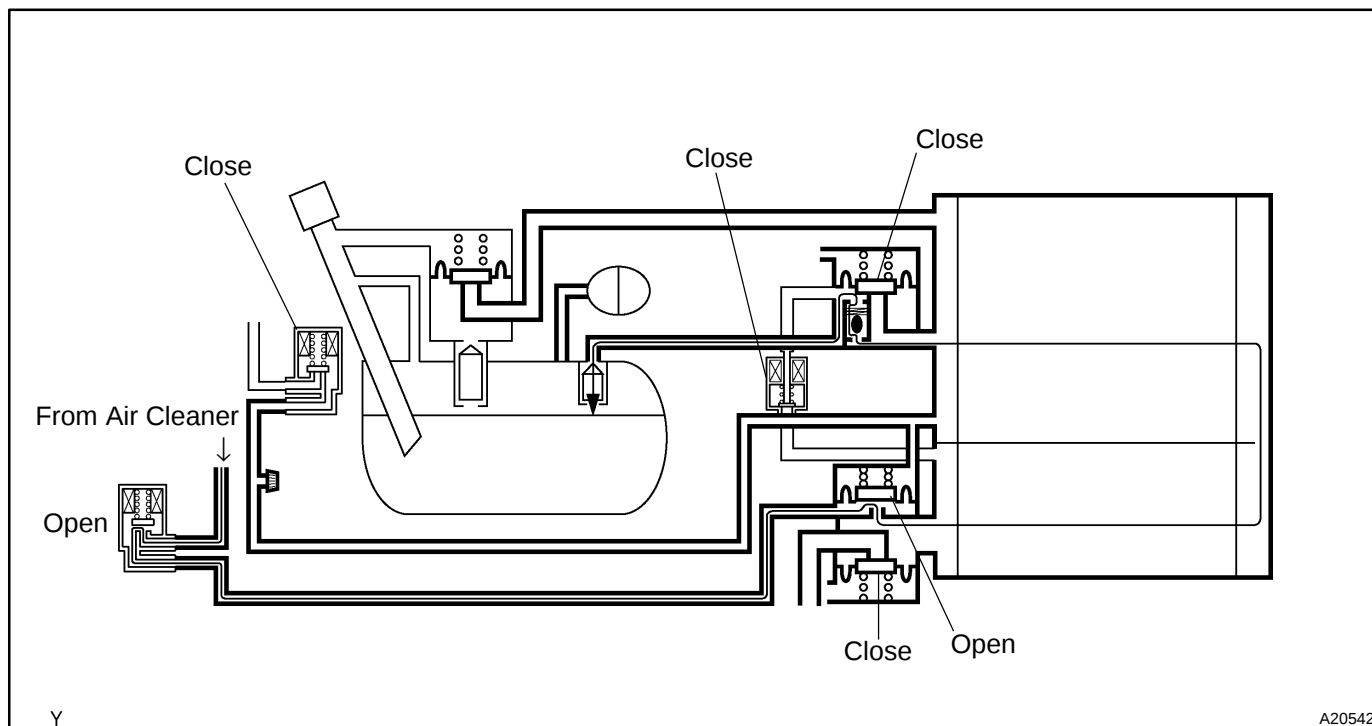
4. EVAP VSV Monitor (DTC P0441)

At a predetermined point, the ECM closes the canister closed valve and opens the VSV for bypass valve causing a pressure drop in the entire EVAP system. The ECM continues to operate the EVAP VSV until the pressure is lowered to a specified point at which time the ECM closes the EVAP VSV. If the pressure does not drop, or if the drop in pressure increases beyond the specified limit, the ECM judges the EVAP VSV and related components to be faulty and the MIL illuminates.



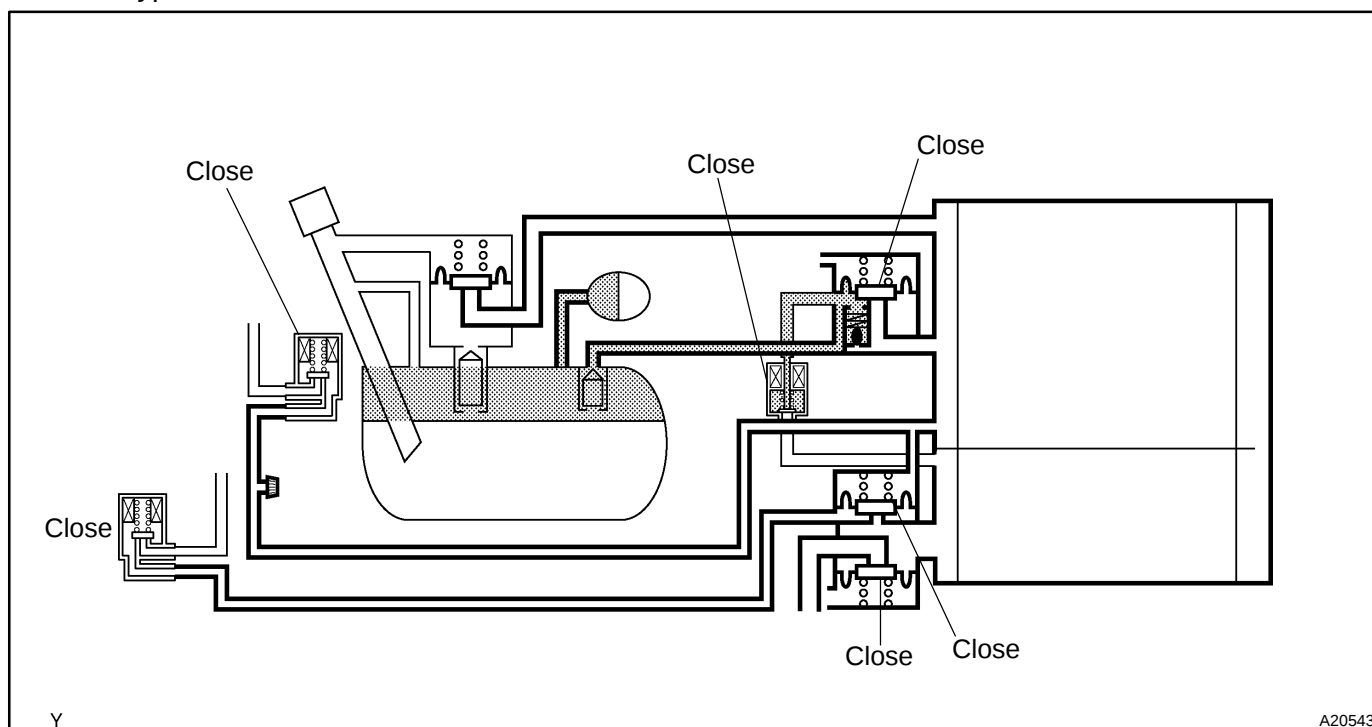
5. Canister Closed Valve Monitor (DTC P0446)

This stage checks the canister closed valve and vent (air inlet side) operation. When the vapor pressure rises to a specified pint, the ECM opens the canister closed valve. Pressure will increase rapidly because of the air allowed into the system. No increase or an increase below specified rate of pressure increase indicates a restriction on the air inlet side. If a malfunction is detected, the MIL illuminates.



6. VSV for Bypass Valve Malfunction (DTC P0446)

The ECM closes the VSV for bypass valve. This action blocks air entering from the tank side of the system. The pressure rise is no longer as great. If there was no change in pressure, the ECM will conclude that the VSV for bypass valve is not closed. If a malfunction is detected, the MIL illuminates.



7. Vapor Pressure Sensor Monitor (Previous DTC: P0450) (Extended DTC: P0452/P0453)

If the output voltage of the vapor pressure sensor is out of the normal range, the ECM will determine that there is a malfunction in the sensor or sensor circuit. The ECM will illuminate the MIL (2-trip detection logic) and set a DTC.

8. Vapor Pressure Sensor Range/Performance Monitor (DTC P0451)

The ECM checks for a “noisy” sensor or a “stuck” sensor.

The ECM checks for a “noisy” sensor by monitoring the fuel tank pressures when the vehicle is stationary and there should be little variation in the tank pressure. If the indicated pressure varies beyond specified limits, the ECM will illuminate the MIL (2-trip detection logic) and a DTC is set.

The ECM checks for a “stuck” sensor by monitoring the fuel tank pressure for an extended time period. If the indicated pressure does not change over this period, the ECM will conclude that the fuel tank pressure sensor is malfunctioning. The ECM will illuminate the MIL (2-trip detection logic) and a DTC is set.